

CO₂ Capacity Sorbent Analysis using Volumetric Measurement Approach

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In support of air revitalization system sorbent selection for future space missions, Ames Research Center (ARC) has performed CO₂ capacity tests on various sorbents to complement structural strength tests from Marshall Space Flight Center (MSFC). The materials of interest are: Grace Davison Grade 544 13x, Honeywell UOP APG III, VSA-10, BASF 13x, and Grace Davison Grade 522 5A. Each sorbent's CO₂ capacity was measured using a Micromeritics ASAP 2020 Physisorption Volumetric Analysis machine to produce 0C, 10C, 25C, 50C, and 75C isotherms. These datasets were then extrapolated using Langmuir 3-Site and Toth isotherm models to compare with previously measured capacity data from MSFC using a thermogravimetric analysis approach. The modeling and extrapolation from ARC data correlated well with data measured at MSFC.

Nomenclature

ARC	=	Ames Research Center
CDRA	=	Carbon Dioxide Removal Assembly
CO ₂	=	Carbon Dioxide
MSFC	=	Marshall Space Flight Center

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TGA = Thermogravimetric Analysis